M.O. 326.

The Meteorological Magazine

Air Ministry :: Meteorological Office

Vol. 65
Nov., 1930
No. 778

LONDON: PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE

To be purchased directly from H.M. STATIONERY OFFICE at the following addresses: ADASTRAL HOUSE, KINGSWAY, LONDON, W.C.2; 120, GEORGE STREET, EDINBURGH: YORK STREET, MANCHESTER; 1, ST. ANDREW'S CRESCENT, CARDIFF; 15, DONEGALL SQUARE WEST, BELFAST; or through any Bookseller.

Maurice Alfred Giblett, M.Sc., 1894-1930

Life is the most precious possession of man; yet there are those who are ready to risk it for a high ideal. Religion, patriotism, affection, knowledge, are all ideals which at times demand the decision to put life to the hazard and we honour to the full those who accept the risk for the sake of the ideal. A long sequence of names of those who have taken the risk and lost flashes into one's mind. These are the names which we honour above all others, the names we quote with pride of race, the names we teach our children as examples. To that long list we have now to add the name of our colleague and friend, M. A. Giblett, who lost his life when on meteorological duty in the ill-fated airship R 101.

During the last six years Giblett has devoted his life to the study of the atmosphere as the highway of the airship. His ideal was to make the atmosphere the servant of the airship and not its master. This is not a rhetorical phrase, but a simple statement of the objects of his endeavour. He saw quite clearly that an airship could not, like a train or even an aeroplane, go straight ahead and conquer the air by superior force. He saw that on occasion the airship would have to submit to the winds, but he also saw that with sufficient knowledge the winds could be used to help the ship: this of course was common knowledge, something which we all knew, but to Giblett it was something more than knowledge—it was something he had to do.

(91727) P.S.14/89 1,050 11/30 M. & S. *Gp.303*

For six years he worked indefatigably on the problem. By a laborious study of past weather he worked out the best world tracks for airship lines and in co-operation with the navigators of the airship he examined how to navigate the airship along these lines so as to make the best use of the wind currents as they changed from day to day. He organised a wonderful system for the transmission of weather information to the airship by wireless and taught the navigators of the ship how to use the information received. He studied thunderstorms, line squalls and waterspouts in order to estimate their danger and how to circumnavigate them.

It is not, however, my object in this short note to describe Giblett's work, but to put on record the spirit in which he worked. With a devoted band of workers at Cardington, Giblett literally wrapped himself up in his work for airships. He had little or no time for outside interests; but with a single purpose devoted himself to perfecting the meteorological organisation on which, he was firmly convinced, the success of airship transport would ultimately depend. It was never intended that Giblett should be the meteorological officer to accompany the airships; but he felt that in the initial stages, while the organisation he had built up was being tried out, his proper place was on the airships. He therefore obtained permission to accompany each airship on its trial and first overseas flights.

He knew, of course, that there was risk, especially on these early flights; but his enthusiasm for his work was so great that he was prepared to accept the risk as being all in the day's work. This was the attitude of everyone who took part in the fatal flight and one feels confident that each would have said exactly the same as Captain Scott said in similar circumstances: "We took risks, we knew we took them; things have come out against us, and therefore we have no cause for complaint, but bow to the will of Providence, determined still to do our best to the last."

The Meteorological Office has lost an assistant of whom great things were expected, an able scientist and an exceptional organiser; his colleagues have lost a friend, but his mother, wife and daughter have lost much more, and it is to them that our thoughts go out with the deepest sympathy; may the knowledge of the high esteem and affection in which he was held comfort them in their grief. G. C. SIMPSON.

The Loss of the R 101

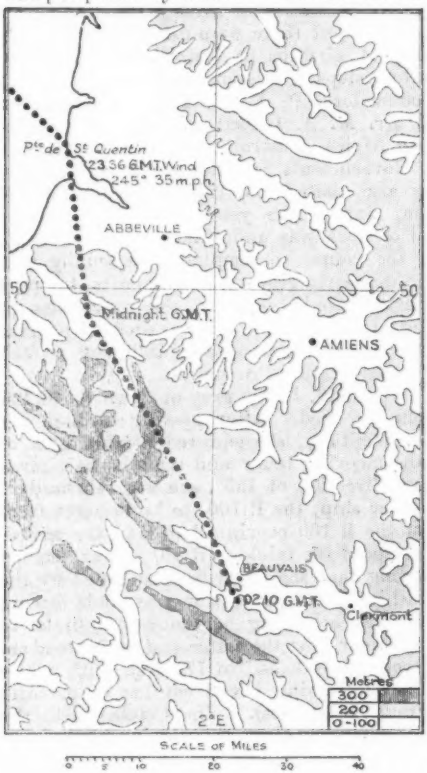
The programme under which the two airships R 100 and R 101 were built was initiated by Mr. Ramsay MacDonald's Govern-

ment in 1924, the general concept of that programme being a far-sighted one of the eventual linking of the whole Empire by airship routes, but while this was the ultimate aim the first step was primarily the establishment of airship communication with India, and with this object there were established mooring towers for the handling of airships at Ismailia and Karachi. Among other preliminary steps a mission consisting of Group Captain (now Air Commodore) P. F. M. Fellowes, Squadron Leader S. Nixon and Mr. M. A. Giblett was sent in 1927 to the Dominions of South Africa, Australia and New Zealand to advise the Dominion Governments on sites for airship bases. On the way back they also visited and inspected Karachi and Ismailia. In addition, during the years between 1924 and 1930 a very great deal of work was undertaken in the meteorological exploration of the routes contemplated, especially that leading to India, for it was early realised how important a part meteorological information would play in the operations of airships. The building of the ships, too, proceeded with great thoroughness and some considerable delays inherent to the development of many novel features in design.

At last, on October 12th, 1929, in the grey of dawn the R.101 was first launched from her shed. After passing through her trials, during which incidentally, she endured a wind gust of 83 miles per hour at the mooring tower and some hours later a very rapid veer in wind direction of 135°, she was rehoused in her shed to allow her sister ship, the R 100, to be brought from Howden. The trials of the R 100 continued during the winter and spring. On the results of the trials of R 101 it was decided that the ship was so strong that she could be lengthened by the addition of a bay amidships. This alteration was made during the period when R 100 was achieving her successful flight to Canada in August of this year. At the latter end of September, R 101 was once more ready, lengthened to 777 feet, with a new outer cover and with new reversing Diesel engines (a problem that had presented great difficulties). On October 1st, she started for a 16 hours' trial, returning the morning of the next day, and to those who saw her manœuvring on that trial, she seemed one of the most beautiful and graceful things that man had made.

The start for India was planned for the evening of Saturday, October 4th, the evening being chosen that she might start in the cool of the day when her lift would be greatest and that she might have night conditions for navigating across northern France when her load would be greatest. Two main routes were open to her, by Dijon and the Rhone Valley or to westward of the French Central Massif and so to the southern French coast to northward of the Pyrenees. While before her start it was anticipated that the latter route would be chosen, the final

decision was not to be made till after Paris had been reached. The time of her departure originally fixed for 6 p.m. (B.S.T.) was postponed by an hour. Before that time a small crowd had assembled at the foot of the mooring tower, enviously bidding good-bye to their friends and watching the bustle of final preparations. Seven o'clock came and with it dusk began to fall. Engine after engine sputtered and purred in the last test. There was difficulty with the forward port engine, one of the newest type and the only one in which petrol was entirely eliminated by even the starting engine being driven by heavy oil, but the trouble was only with the starting engine and after a delay of some twenty minutes that, too, took up its tale.



THE SCENE OF THE DISASTER TO H.M. AIRSHIP R 101, OCTOBER 5TH, 1930.

The course of the ship is indicated by the broken line joining reported positions.

Darkness had fallen. In the brightly-lit passengers' saloon could be seen figures waving farewell. She cast off. A lamp in the control car flicked a last message. The first drops of the approaching rain spattered the onlookers. The ship bore up into the wind and circled over Bedford, then made her course south for London.

The story of her flight is best told in the messages she sent :—

9.21 p.m. (B.S.T.)—Over London, moderate rain, base of low cloud, 1,500ft.; wind, 240°, 25 m.p.h.; course now set for Paris.

Intend to proceed via Paris, Tours, Toulouse and Narbonne.

10.47 p.m. At 10.35 crossing coast in vicinity of Hastings. It is raining hard, and there is a strong south-westerly wind. Cloud base is at 1,500ft. After a good getaway from the mooring tower at 7.30, ship circled Bedford before setting course. Course was set for London at 7.54. Engines running well at cruising speed gave 54·2 knots (62 m.p.h.) Reached London at 9 o'clock, and then set course for Paris, gradually increasing height so as to avoid high land. Ship is behaving well generally, and we have already begun to recover water ballast.

12.36 a.m. Crossing French coast at Pointe de St. Quentin; wind 245° true, 35 m.p.h.

1 a.m.—15 miles south of Abbeville, course and speed made good from 7.30 various, 33 knots (38 m.p.h.); altimeter height, 1,500ft.; air temperature, 51°; intermittent rain; cloud, nimbus at 500ft.; conditions since departure similar; temperature uniform. After an excellent supper our distinguished passengers smoked a final cigar, and, having sighted the French coast, have now gone to bed to rest after the excitement of their leave-takings. All essential services are functioning satisfactorily. The crew have settled down to watch-keeping routine.

At about 1.50 G.M.T. she was heard getting her position from Le Bourget which was given her as one kilometre north of Beauvais. She was heard to thank Le Bourget and say she was going on to another wave length, presumably to pick up the 2 o'clock synoptic weather message from the Air Ministry. At 2.10 she struck the hillside about four miles south of Beauvais.

The evidence as to what occurred during and immediately before the disaster is scanty and as is natural in an accident of this sort, some conflicting accounts have been published. Of the 54 on board only six were saved, four of whom were in the three aft engine cars and consequently were not so entirely trapped by the mass of the ship after the crash. The other two, Mr. H. J. Leech, foreman engineer, and Mr. A. Disley, one of the wireless operators, were at the time actually in the hull. From their accounts and those of people who were in the neighbourhood, it is clear that the ship gave two distinct steep dives before she struck the ground and between these dives, she returned to a level keel. An important statement is that of Mr. Disley who was warned by the Chief Coxswain, just before the ship entered the second dive, that the ship was doomed. In the second dive the ship struck the ground, the nose moving forward in a bound after the first impact. As it struck the second time there was a burst of flame and the whole ship became enveloped.

Others have written of the men who perished in her. To those who worked with them they were a compact unit, they saw a grand ideal and their determination and faith was, and is,

infectious. Perhaps Sir Samuel Hoare best epitomises their qualities when, after alluding to Lord Thomson's fine mind and vivid enthusiasm and Sir Sefton Brancker, whose name stands most conspicuously for civil aviation in every country in the world, he says:—

"These were two notable personalities. The other victims were only now stepping upon the front of the stage, their names still to be established, their careers not yet consummated. Richmond, the subtle designer, who laboured well the minute particulars of every plan; Scott the fearless navigator, who had twice taken an airship across the Atlantic; Colmore, the quiet and tactful administrator who supervised the work of Cardington; Irwin, the captain of the ship, as brave in death as he had been steadfast in life; Johnston, who in the teeth of rain and sand and wind could keep a course as straight as a furrow; Giblett, the meteorologist, who with rare skill helped to chart the air between England and the East—these were the men who if they had lived would have stamped their achievements upon British history. I knew them well. For years we worked together. They were as a religious community intent upon a high ideal. Neither disappointment nor success deflected them from their life's work. When I talked with them at Cardington I knew that I was in the presence of determined men of set purpose. When I flew with them I marked the rare balance between brain and hand and eye that their airmanship displayed."

To this list may be added Rope, who as Richmond's right hand, solved many intricate problems of construction; Atherstone, the conscientious and thorough; Steff the cheerful.

C. S. DURST.

M. A. Giblett: His Life and Work

Maurice Alfred Giblett was born at Englefield Green, Surrey, on July 15th, 1894, and was educated at Upton School, Slough, and Modern School, Maidenhead. He received his University training at University College, Reading, from which he took his B.Sc. degree at London in 1914, with first-class honours in pure and applied mathematics. He afterwards completed two years' post-graduate work at East London College, University of London, taking his M.Sc. degree in mathematics later. In 1916 he joined the staff of H.M.S. *Worcester*, under Captain Sir David Wilson Barker, as instructor in meteorology and navigation. After completing a cadet course at the Royal Garrison Artillery Cadet School at Uckfield, he was commissioned in the Meteorological Section, Royal Engineers, in July, 1919, for service with the British Expeditionary Force in north Russia. On the withdrawal of the British Expedition he returned to England

and in October, 1919, was appointed a professional assistant in the Forecast Division of the Meteorological Office.

From the outset of his official career Giblett showed himself to be possessed of more than ordinary scientific ability and this, combined with a keen power of application, soon brought him into prominence. In 1922 he was appointed meteorological secretary of Section A of the British Association, a service which he performed with conspicuous success. It was characteristic of the man that after the meeting of the Association held in Toronto in 1924, he seized the opportunity which was offered him of visiting the Meteorological Service of Canada and the United States Weather Bureau establishments at Washington and New York in order to study their organisations. It may be mentioned in this connexion that he had been one of the first to realise the importance of the new ideas regarding the structure of depressions which had been developed in Norway during the war, and this had led to a close friendship between him and J. Bjerknes. While on the visit to America he carried out an investigation in collaboration with Bjerknes, who was also there on a visit, on the structure of a retrograde depression over the eastern United States of America, a piece of work which was published in the *Monthly Weather Review* in the same year. On the return voyage from America he again collaborated with his Norwegian colleague in demonstrating the practicability of weather forecasting at sea. This was accomplished by arranging for the ship's wireless station to pick up weather reports from other ships in addition to synoptic data from America or Europe, and drawing synoptic weather charts on board.

Another opportunity which offered itself during Giblett's period of service in the Forecast Division, was to participate in a cruise in the North Sea in the summer of 1921 on the research trawler *George Bligh*, belonging to the Ministry of Agriculture and Fisheries. During this cruise he carried out an investigation on the effect of the rolling of the ship on the readings of a standard Kew pattern marine barometer. The results of this investigation were afterwards published in a memoir in the *Philosophical Magazine*. Perhaps, however, Giblett's most important contribution to theoretical meteorology during this period of his career was a brilliant paper read before the Royal Society in 1921 on evaporation from large expanses of water, in which he applied recent knowledge regarding atmospheric turbulence to discussing the process by which the air obtains its supply of water vapour from the oceans and calculating the amount of evaporation which occurs in various conditions of wind speed and water surface temperature. His other contributions to meteorological literature about this time, while of a minor nature, were yet of a high order, consisting chiefly of

analyses of atmospheric conditions associated with selected meteorological situations which he came across in the course of his official duties as a forecaster.

Giblett's association with airships began as early as 1921, when he was released temporarily from the Forecast Division and posted for duty in connexion with the trials of airships R 80, R 36 and R 38. His work on this service earned a warm expression of appreciation from Air Commodore Maitland, who was then in charge of airship organisation. When, in 1924 it was decided to revive the development of airships, Giblett, who had been promoted to the grade of Assistant Superintendent in the Forecast Division in 1922, was selected for the post of Superintendent of the Airships Services Division of the Meteorological Office, which was formed on January 1st, 1925, to study the special problems connected with the meteorological conditions affecting airship navigation, to investigate in detail the meteorological conditions along projected airship routes and to draw up an organisation for the supply of data and forecasts during airship operations. Giblett threw himself wholeheartedly into his new work and from the date of his appointment directed his entire energy to mastering the problems connected with meteorology and airship navigation.

Reference has been made already to Giblett's scientific ability and power of application. To these assets must be added two additional qualities which evinced themselves and stood him in good stead in his new work, namely, organising ability and personality. The former was evident in the masterly way in which he built up his local meteorological service at Cardington and developed the organisation which he visualized as essential to the operation of an Empire airship service, while the latter won for him from the outset the friendship and esteem of the Airship Staff at Cardington, with whom he had to work. Moreover, he was not satisfied with simply building up an organisation to meet the demands for meteorological data which, he knew, would be made on him, but he made it his business to become familiar with every aspect of airship design, mooring and operation in order that he might give the Airship Staff the best meteorological information possible. He became a definite part of the airship organisation at Cardington.

The first two years of the new Airship Services Division were devoted almost entirely to carrying out a programme of work for the investigation of meteorological conditions along proposed airship routes to Egypt and India, and the discussion of special conditions at projected airship bases. It is impossible in the space available to give a complete account of this investigational work, but it included a detailed study, not only of the average conditions along the routes and the special characteristics of the bases, but also of the general distribution of weather and

wind on individual days and of the day-to-day changes. The latter was a remarkable piece of work, involving the preparation of a series of daily weather charts for the whole area embracing the route from England to India. From November, 1925, to January, 1926, Giblett was absent on a tour of duty in Malta, Egypt, Italy and France, when he investigated the sources of meteorological information which could be drawn upon for his investigations and also, when the time came for airship operations, for the meteorological reporting and forecasting organisation.

The Imperial Conference which was held in London in 1926 made further demands on Giblett's resources, for he was called upon to prepare a comprehensive memorandum on various aspects of meteorological work in relation to the development and operation of Empire airship services. This memorandum, which was characteristically complete and informative, was published in a book presented to the Conference by the Secretary of State for Air, and entitled "The Approach towards a System of Imperial Air Communications." As a result of the Conference it became necessary for Giblett to devote the greater part of his time to the consideration of questions concerning the probable future main airship routes to the various Dominions. He prepared comprehensive reports on the meteorological conditions in the vicinity of twenty-seven places in the areas within which the main Imperial airship routes could best be developed from the meteorological point of view. This work formed the basis of discussion with the Dominion authorities when, in 1927, the Air Ministry dispatched an Airship Mission in the charge of Group Captain P. F. M. Fellowes, Director of Airship Development, to visit South Africa, Australia, New Zealand and Ceylon, for the purpose of surveying possible sites for the erection of airship mooring towers. Giblett was a member of this Mission and in addition to acting in his capacity as technical adviser, he took every opportunity of obtaining further meteorological data and of discussing with the local authorities the meteorological ground organisation which would be required for the operation of airship services. He visited India and Egypt before returning to England.

From the foregoing brief, and far from complete, account of Giblett's activities during the years following his appointment as Superintendent of Airship Meteorological Services, it will be readily gathered that he had little time available for purely scientific work apart from his official duties. The latter, however, presented him with ample material for scientific investigation, and during this period he carried out several special pieces of work which had a bearing on the safety and operation of airships. Among these may be mentioned a report prepared in collaboration with Wing Commander T. R. Cave-Browne-Cave,

of the Airship Staff, on "Selected records of upper air temperature and humidity in different localities with special reference to the maximum water recoverable from the exhaust gas of an airship in flight," a discussion of the magnitude of intense vertical atmospheric currents and of the winds in tornadoes and waterspouts and detailed investigations of special phenomena such as the destructive Persian Gulf cyclone of October, 1925, and a line squall at Malta in December, 1925, which was accompanied by waterspout phenomena. He also found time to make a detailed study of line squalls and waterspouts, and in March, 1927, read a paper before the Royal Aeronautical Society which probably contains the most complete account of the subject in existence, and which included certain new ideas on the structure of line squalls.

Mention must be made here of two pieces of full-scale research at airship bases which were initiated by Giblett. The first, which was commenced on behalf of the Aeronautical Research Committee, was an investigation into the detailed gustiness and rapid changes of the wind as affecting the problem of the mooring of large rigid airships, from both the design and the operational points of view. While the primary object of the research was to obtain data for these practical purposes, the results, which are not yet complete, promise to provide a great deal of new information of importance in theoretical meteorology since observations of such a detailed character have never formerly been attempted. Special anemometers recording the velocity and direction of the wind at a height of 50 feet above the ground were installed at Cardington at the corners of an equilateral triangle with sides 700 feet long, this being approximately the length of an airship, while a fourth anemometer was erected at the middle point of one of the sides. The anemometers were specially adapted so that records of the individual gusts were obtained on a very open time scale and the instruments were connected by an electrical timing system which enabled any fluctuation in the wind at any one position to be timed to a second and so permitted of accurate comparison between the records obtained on the different instruments. From the tabulation of the records eddies of different magnitude were sorted out and their horizontal extent in different directions, rate of movement and degree of persistence were studied. A second part of the research was devoted to a similar detailed examination of the rapid and almost instantaneous change from one general wind to another from a totally different direction such as occurs during the passage of a line squall. The research has already yielded certain striking and valuable results and when completed it will form a classical piece of meteorological literature.

The second investigation, which is being carried out at Ismailia, the airship base in Egypt, aimed at obtaining a con-

tinuous record of the temperature lapse rate during day and night in the first few hundred feet above the surface, this information being of fundamental importance in connexion with the problem of mooring airships in a hot climate. A special mast 200 feet high was erected near the site for the airship mooring tower and electrically recording thermometers were installed on the mast at various levels above the ground. This installation has already provided much valuable data.

By 1929 the two new airships R 100 and R 101 were nearing completion, and Giblett's attention was directed to perfecting his forecasting service which had been gradually built up at Cardington and to completing the details of the meteorological organisation along the airship route to India. The decision to send R 100 to Canada necessitated a new investigation into meteorological conditions over the Atlantic and Giblett devoted considerable time in the early part of 1930 to discussions with the airship officers on the times which would be taken by the airship to cross to Canada by various routes in different wind conditions.

By the time the airships were ready for their home trials, Giblett had his organisation complete in every detail. During the first trial flight and the endurance flights of each airship he obtained permission to be on board in an official capacity in order to see the organisation working at first hand, and to ensure that it was satisfactory. He would not leave anything to chance. When the R 100 made her flight to Canada and back, although he could have arranged for a member of his professional staff to go on the flight as meteorological officer, he himself filled this post and the information which he provided for the Captain and Navigator of the airship played no small part in the success of this experimental flight. He chose to accompany the ill-fated R 101 in a similar capacity and only a few days ago one of the survivors related at the Public Inquiry now being held into the loss of the airship, how, two hours before the disaster, he saw Giblett engaged in the control room in completing his weather chart which was to form the basis of the last advice he was to render in the service of airships.

Giblett lived for his work. Thoroughness was the keynote which marked it throughout his career. Whatever he undertook, whether of a major or minor nature, he was not satisfied unless he had put his best into it. Beloved by his staff at Cardington, he knew how to engender and encourage team work. Although his work meant so much to him, he could relax at the proper time, and it would have been difficult to find a more agreeable companion. By his untimely death those who knew him best have lost a loyal friend and devoted colleague, while the world has lost a brilliant scientist.

F. ENTWISTLE.

From the Meteorologists at Cardington

Of Mr. Giblett's scientific distinction others are better qualified to write, but the observing and wireless staff at the Meteorological Office, Cardington, who have worked with him in all the ups and downs of the past two or three years, think of him from a different angle.

He was so appreciative of everything we did, and his whole personality was so even and genial, that to work with him was a very real pleasure. Any service, big or small, was received with a quiet smile, a careful scrutiny, and always a word of thanks. Accuracy and neatness he expected to a high degree, but criticism of a completed task was rare, for he had the ability to explain exactly what he wanted before any work was commenced.

The Cardington Meteorological Office was his special pride, and we strove unceasingly to come up to the high standard expected of us. Our suggestions were welcomed and used, and the whole staff worked as a team. Whether during the strenuous days of airship operations, or the quieter atmosphere of investigations, everything revolved around our Superintendent. We were disciplined without being aware of it, for he inspired loyalty, and we in turn could rely on his strong backing. He was always willing to advise, though never interfering; ready for a joke in the lulls of high-pressure work, but never familiar; taking a share of night duty to help those whose time was full; never a hasty word; one of us, though unquestionably the leader, and continually spreading his intense zeal to all around.

We miss him at every turn. We valued his considerate knock and momentary pause before entering our room, but above all was his gift of appreciation. It falls to the lot of few to work under such a man, but we who did so will ever hold his memory in affectionate regard as the ideal chief, gentleman and friend.

It was the privilege of the writer to work closely with Mr. Giblett in his meteorological organisation for the flight of R 101 to India, and to spend the last afternoon with him going over final details before he went on board. We packed together the key charts, code cards, etc., for drawing charts *en route*, and tied up his flying kit in a rough parcel, sun helmet dangling on the side. With a few beautifully chosen words of thanks, and a firm shake of the hand, he left us.

Our thoughts were primarily of him while he and his comrades were being honoured in St. Paul's Cathedral by the highest of the British Empire; we stood in the lane at Cardington, within sight of the office, grouped round our deeply grieved Officer-in-Charge, to pay our last respects, and now hope for the day when sudden gusts of wind will not cut so sharply.

W. A. L. MARSHALL.

Messages of Condolence

Immediately that the disaster to the R 101 became generally known, many letters and telegrams of condolence were received in the Meteorological Office from all parts of the world. The majority of these referred specially to Mr. Giblett, and came from meteorologists at home and abroad who had met him in the course of his work and had become his friends. Messsages were received from the following:—

Major J. Agostinho, Director of the Serviço Meteorologico dos Açores, Ponta Delgada; Dr. B. N. Banerji, Meteorologist-in-Charge at Karachi, India; Mr. W. E. Benbow, Assistant Editor of the "Metal Industry"; Regierungsrat Dr. R. Benkendorff, Reichsverkehr-ministerium, Berlin; M. R. Bureau, Chief of the Service de Transmission, Office National Météorologique, Paris; Colonel J. Waley Cohen; M. le Général Delcambre, Director of the Office National Météorologique, Paris; the Deutsche Seewarte; Dr. G. M. B. Dobson; Baron A. de Dorlodot, Brussels; Professor E. van Everdingen, Director of the K. Nederlandsch Meteorologisch Instituut, De Bilt; M. A. Gião, Institut Royal Météorologique, Brussels; Geheimrat Prof. Dr. H. Hergesell, Director of the Preussisches Aeronautisches Observatorium, Lindenberg; Mr. H. A. Hunt, Commonwealth Meteorologist, Australia; the Indian Meteorological Department; Dr. K. Keil, Leitung des Flugwetterdienstes, Berlin; Dr. D. la Cour, Director of the Dansk Meteorologisk Institut, Copenhagen; Dr. F. Linke, Director of the Universitäts-Institut für Meteorologie und Geodynamik, Frankfurt-am-Main; Rev. R. M. B. Mackenzie; Dr. C. F. Marvin, Chief of the United States Weather Bureau, Washington; Dr. C. W. B. Normand, Director-General of Observatories, Poona, India; Mr. J. Patterson, Director of the Canadian Meteorological Service; Sir Richard Redmayne, President of the Institution of Professional Civil Servants; Mr. P. J. G. Rose, Assistant Under-Secretary of State for Scotland; Sir Napier Shaw; Mr. C. D. Stewart, Malayan Meteorological Service, Kuala Lumpur; and Dr. G. Swoboda, Deutscher naturwissenschaftlich-medizinischer Verein, Prague.

Extracts from some of these messages follow:—

Major J. Agostinho.

"The destruction of the airship R 101 and the loss of so many lives is the cause of our most deep regret. I beg to convey the expression of our profound concern for the death of the Superintendent of the Airship Meteorology Division."

W. E. Benbow, Esq.

"I knew him years ago as a brilliant and enthusiastic mathematician. At that time (1916) he was on the staff of Dartford Grammar School, and those whom he taught will not soon forget

his aptitude for making hard things easy. For myself, I owe what mathematical skill I have to his patient tuition."

Regierungsrat Dr. R. Benkendorff (addressed to Captain Entwistle).

"I learn to-day that in the deplorable accident to the R 101 your colleague—I may, I hope, say our colleague—met his death. In this great loss which English meteorology and in particular aeronautical meteorology has suffered, please accept my most sincere sympathy and that of us all.

I often thought during the war, how beautifully they die, who fall in the moment of attack, the summit of endeavour. So it was with Giblett. Just when he could translate into action the knowledge which he had gained, in the consummation of his strenuous labour, on the flight to which he had doubtless for long looked forward, death overtook him. This is indeed but poor comfort for the loss of the man himself."

M.R. Bureau (addressed to Captain Entwistle).

"Jusqu'aux journaux de ce matin qui publient la liste des victimes du R 101, j'avais conservé l'espoir—si faible fut-il—qu'un événement aurait empêché Giblett de monter à bord. Il me faut bien maintenant me rendre a l'évidence. Croyez à la part bien profonde qui je prends aujourd'hui au deuil du Meteorological Office au milieu du grand deuil britannique. En Giblett, c'est aussi un ami que je perds."

Colonel J. Waley Cohen.

"May I venture to offer you and through you to all your staff my most sincere sympathy on the loss of your airship colleague. Giblett was always such a pleasant and delightful person to work with that I fully realise what a loss he must be to you all, apart from his great experience."

Baron Albert de Dorlodot (addressed to Captain Entwistle).

"I have just heard from London the full list of casualties in the R 101. All day, I hoped Giblett might not have been on board. Now I know and I wish to offer you my deepest sympathy. I have always imagined you and Giblett were brothers, so much you carried out well together and I realise how much you must feel the tragic loss of one of the very best of men.

Will you please offer my profound sympathy to Dr. Simpson and tell him that the death of Mr. Giblett is felt in services abroad as in the British service. By his technical ability and by his personal charm, he made friends of all he met."

M. le Général Delcambre.

"Veuillez agréer l'expression de la vive et douloureuse sym-

pathie de l'Office National Météorologique de France pour l'épouvantable malheur qui vient de frapper nos camarades de l'Aéronautique Britannique.

Mes collaborateurs Bureau et Wehrle et moi-même ne pensons pas sans une profonde tristesse à nos camarades et amis Brancker et Giblett qui ont trouvé une fin si tragique sur le sol de France où nous avions tant de joie à les rencontrer."

Mr. H. A. Hunt.

"I desire to express the deep sorrow and sympathy of myself and officers of this Bureau at the tragic death of Mr. M. A. Giblett, M.Sc., through the R 101 airship disaster."

Dr. K. Keil (addressed to Colonel Gold).

"My colleagues in the German aviation weather service and I were deeply shocked yesterday at the dreadful news of the terrible disaster to the British airship R 101. We desire to express our deepest sympathy with you and the Meteorological Office which has also lost a colleague in this disaster."

Dr. D. La Cour.

"I scarcely know how to express my deep feeling of grief learning this morning the sad news of the disaster of the British airship R 101. But I know that this airship marked important steps forward on the way of mankind."

Dr. F. Linke, Frankfurt-am-Main (addressed to Dr. Simpson).

"At mid-day to-day I heard the broadcast of the memorial service for the unfortunate crew of the R 101 and I feel compelled to do what I intended to do last Sunday, namely, to write and tell you of the universal mourning in Germany.

I know that in many circles in England the heart of the German people is misjudged, and there might be Englishmen who think that there was malignant joy in Germany. There was not a trace of it. Everybody recognised the sad tragedy that the first airship which was to have linked up two of the most important parts of the British Empire was a victim to *force majeure*.

Doubtless you knew those who died in England's service personally, therefore you have double grounds for mourning. I should like to assure you that I and all your other German friends sympathise with you."

Dr. C. F. Marvin (cabled).

"Weather Bureau staff expresses deep regret at loss of R 101 and its brave officials and crew. Death of Giblett, Scott and others is irreparable loss to meteorology and aerial navigation."

Dr. C. W. B. Normand.

"It was a great blow to read of the disaster to R 101. . . . . I could picture to a small extent the awful shock of the news to Cardington, to the officers' homes there and to the workers. I had met most of the officers and was looking forward to seeing them again at Karachi. Poor Giblett! He had worked unsparingly for several years for airship meteorology, he had both scientific and business capacity and was one of the most promising of British meteorologists. We were very sorry to read about his loss, as well as of the others. I could see that the news was a real grief to my Indian officers and staff also.

The Karachi Meteorological Office had shifted out to a camp at the airship mast and had their organisation working satisfactorily there. Enthusiasm was high—but suddenly and tragically ended when the news came through."

Sir Richard Redmayne.

"I should like to express the deep sympathy of the Institution of Professional Civil Servants in the great loss you have sustained in the R 101 disaster in the death of Mr. M. A. Giblett, who was a member of the Institution. I am sure that at the Air Ministry you must feel completely crushed by the loss both of many personal friends, and of so much irreplaceable talent."

P. J. G. Rose, Esq.

"Like everyone else I am terribly grieved at the disaster to R 101 and I am specially grieved at the loss of your brilliant assistant, Mr. Giblett, who has rendered such distinguished services to meteorology, especially in connexion with airships."

Sir Napier Shaw.

"Please express to the Air Ministry on my behalf profound regret and sympathy about the disaster to R 101. They will know better than I how to appreciate the loss of their Chief and the officials on the airship side; but the results and future promise of Giblett's work upon the air came very near to me and the disaster brings them still nearer. I must put on record the consciousness of the gap that his death makes in your scientific staff."

Mr. C. D. Stewart.

"We have just heard here of the dreadful disaster to the R 101. It has naturally come as a great shock, particularly so to me as several of those killed, as well as Mr. Giblett, were well known to me personally; but it can be nothing to the way in which you must have been affected and I can only express my very deep sympathy, while being conscious that nothing that I can put in a letter can convey what I really feel."

Dr. G. Swoboda, Prague.

" Veuillez me permettre de vous assurer que j'ai appris avec un profond regret la nouvelle de l'accident du Dirigeable R 101 qui vient de frapper si cruellement l'Air Ministry, l'Aviation anglaise et toute la nation."

Official Notices

Discussions at the Meteorological Office

The subjects for discussion for the next two meetings will be :—

November 24th, 1930.—*The tephigram, its theory and practical use in weather forecasting.* By C. M. Alvord and R. H. Smith (Cambridge, Mass., Inst. Techn., Prof. Notes No. 1, 1929, and Washington D.C., U.S. Weather Bureau, M.W. Rev. 57, 1929, pp. 361-9). *Opener*—Mr. O. G. Sutton, B.Sc.

December 8th, 1930.—*Visibility and atmospheric dust in Paris. The influence of Paris on the radiation received from the sun and sky in the surrounding region.* By Louis Besson Paris, Ann. Serv. Techn. Hygiène, 10, 1929, pp. 169-95 (in French)). *Opener*—Mr. E. G. Bilham, B.Sc., D.I.C.

Comité Météorologique International

Applicants are invited for the post of Chief of the Secretariat of the International Meteorological Organisation, at present located at De Bilt, Holland, and to be transferred to Switzerland in or before 1935.

The task of the Secretariat is indicated in the Statutes as follows :—

" Un Secrétariat, fonctionnant sous la Direction du Président du Comité Météorologique International, est chargé de l'organisation des réunions de la Conférence, du Comité et des Commissions ainsi que de la publication des procès-verbaux. Il constitue également un centre de documentation relatif aux services météorologiques du monde entier et il aide, dans toute la mesure de ses moyens, le Président du Comité et les Présidents des Commissions, dans l'exécution de leurs travaux."

It is necessary that applicants should speak at least one international language beside their native language, and be able to correspond in three.

The salary will be £550-750 with £20 increase every year. Superannuation on the British Federative University superannuation scheme : 5 per cent. deducted from salary, 10 per cent. added by employer, 15 per cent. premium to a commercial insurance policy.

Appointment will be made on probation for two years and will be terminable by six months notice on either side.

Further details will be given on application to Prof. E. van Everdingen, President of the International Meteorological Committee, Utrechtscheweg 74, De Bilt, Holland.

Official Publication

PROFESSIONAL NOTES.

No. 59. *Some observations of upper air temperature in Iraq.* By S. P. Peters, B.Sc., A.Inst.P. (M.O. 272S).

Observations of temperature in the upper air are of considerable importance in meteorology both on account of their theoretical value and also by virtue of their practical application to daily forecasting. Few such observations are available from Iraq and hence special interest attaches to those made there by aeroplane which are recorded and discussed in this note, which reveals conditions, regarding the vertical distribution of temperature over Iraq, markedly different from those usually met with in this country. A knowledge of this is of special importance in aviation.

Books Received

Thirty thousand miles of barograph curves. By Prof. R. de C. Ward (reprinted from the "Geographical Review," xx, No. 2, 1930, pp. 273-7). Being a brief discussion of the record of a barograph during a voyage round the world.

Meteorological observations for 1928, prepared in the Meteorological Office, Wellington. By E. Kidson, D.Sc., F.Inst.P. Wellington, N.Z. 1930.

Hourly values of the weather elements at the Bangalore Observatory, 1914. By C. Seshachar, M.A. Mysore Meteorological Memoirs, No. 10, Bangalore, 1930.

Die physikalischen Grundlagen der meteorologischen Strahlungsforschung und ihre praktische Bedeutung. By Dr. W. Mörikofer (reprinted from the Schweizerischen Medizinischen Wochenschrift 60, 1930, Nr. 15, Seite 333).

The Weather of October, 1930

Mild weather prevailed generally during October, with much rain in the west and southwest and dry, sunny conditions in the east and southeast. The month opened with mainly anticyclonic conditions, which were broken in the southwest by the northward movement of a depression off the coast of Portugal. The 3rd was a particularly sunny day in the southeast, 9·5hrs. sunshine being experienced at Margate, but later small secondary depressions developed over England, giving fairly heavy rain generally during the following night and on the 4th; 2·07in. fell at Borrowdale (Cumberland) and 1·30in. at Oughtershaw

Hall (Yorkshire) on the 4th. A period of unsettled weather ensued, with a large area of low pressure covering the Atlantic and northwest Europe and centres passing eastward across the British Isles. Rain fell daily in most parts, but there were bright periods, especially on the 6th and 9th; 10·2hrs. bright sunshine occurred at Cardiff on the 6th, 10·1hrs. at Durham and 10·0hrs. at Harrogate on the 9th. Rainfall was heaviest and most general on the 7th, when 1·53in. fell at Foffanny (Co. Down). Snow was reported for the first time this autumn on the hills round Inverness and Fort Augustus on the 9th, and ground frosts occurred at many places. Subsequently an anticyclone over the Atlantic moved eastward to central Europe and weather improved over most of England, but continued unsettled, with rain at times in Scotland and Ireland. Sunshine records were generally good in England at this period, especially on the 12th, when 9·9hrs. occurred at Ross-on-Wye. About the 14th the deep depression centred to the south of Iceland, extended eastwards, and the unsettled weather of the west spread over the rest of England. Temperature rose generally, exceeding 65°F. in most parts of England on the 15th-17th, and reaching 70°F. at Greenwich on all three days, while night temperatures in the screen did not fall below 60°F. at places as far apart as Manchester, Ross-on-Wye and Margate on the 15th or 16th. Rain fell generally during this period, but there were many long bright intervals, especially in the southeast; 2·02in. of rain fell at Borrowdale (Cumberland) on the 11th, 2·15in. at Carmarthen on the 15th, and 1·51in. at Foffanny (Co. Down) on the 17th. On the 20th a general change of conditions occurred, and cool, squally northwest winds were experienced in the rear of the depression centred to the southeast of Iceland. For the next week the weather was cold and sunny in the east, but in the west the conditions were cold and unsettled, moderate rain alternating with sunny periods; Dumfries had 8·7hrs. bright sunshine on the 25th, Rothamsted and Clacton 8·9hrs. on the 26th. The coldest days were from the 24th to 27th, temperature not rising above 42°F. at Fort Augustus on the 24th, and 45°F. on the 25th, and 44°F. at Dumfries on the 27th, while the minimum temperature on the grass fell to 18°F. at Burnley and 20°F. at Greenwich on the 27th. Snow and sleet were again reported on the hills in Scotland. A new depression approaching from the Atlantic brought a renewal of mild weather on the 28th, giving cloudy conditions with rain in the north and west, but only a little drizzle in the south. On the 30th and 31st cold air again reached Scotland, but the weather continued mild in England. During the month thunderstorms occurred at Gorleston on the 6th and in the eastern counties on the 24th and 25th, while gales were experienced on the coasts on the 8th, in eastern Scotland on the 18th, and in the west on the

25th. The distribution of bright sunshine was as follows:—

	Total (hrs.)	Diff. from normal (hrs.)		Total (hrs.)	Diff. from normal (hrs.)
Stornoway	67	— 19	Liverpool	97	+11
Aberdeen	117	+ 22	Ross-on-Wye	111	+19
Dublin	91	— 13	Falmouth	97	—19
Birr Castle	75	— 23	Gorleston	147	+38
Valentia	66	— 35	Kew	115	+23

Pressure was below normal over the whole of northwest Europe, Svalbard, Iceland, the greater part of the North Atlantic and Bermuda, the greatest deficit being 10·9mb. at Thorshavn (Faroes), while pressure was above normal over southwest Europe, Switzerland, Italy, the Azores and Newfoundland, the greatest excess being 3·8mb. at Madrid. Temperature was above normal over the whole of western Europe but below normal at Spitsbergen. Rainfall was in excess in southern Scandinavia, central Europe and the western British Isles but deficient elsewhere. In eastern Sweden it was as much as 100 per cent above normal.

A storm which raged through France between the 4th and 6th did damage in various districts. On the night of the 9th a dyke on the left bank of the river Nèthe, near Lierre (Antwerp), suddenly gave way owing to the combined pressure of the waters of the river which was in flood, and the action of the wind which was of gale force. The level of the Rhine and its tributaries was reported to have risen on the same day, and floods did much damage to houses and land in the Saar basin. As the result of heavy rains, serious floods occurred in France on the 14th, mostly in the eastern departments. The upper Seine, Marne, Yonne, Meuse and Arve were all in flood. Railways and roads were cut and several mines at Montceaules-Mines flooded. Dijon and Sédan were partly under water. A violent storm of wind and rain on the 14th swept suddenly through the district near Grenoble, famous for its walnut groves. Before the storm there was an oppressive stillness and a whitish mist spread over the sky. The great wind lasted only a few minutes, but when it dropped the church had lost its steeple, many cottages were unroofed, and nearly 6,000 broken walnut trees lay on the ground. On the 15th the weather over France was fine and warm, and the floods in most districts began to subside, but on the 16th the rivers rose again and the floods continued until after the 21st. The main road between Narbonne and Carcassonne was under water on the 20th. Owing to heavy rain a landslip caused extensive damage at Kalfaret, Bergen, on the 15th, but no lives were lost. At Tarragona (Spain) 14 persons were drowned when the river Francoli flooded the lower parts of the town about the 20th. A heavy northwesterly gale in the Gulf of Lions delayed and damaged ship-

ping on the 25th, 26th and 27th. There was a heavy fall of snow in the Grenoble district and in the Vosges on the 25th, and in the Var, in the Cantal and near Chambéry, on the 27th. A heavy snowstorm swept across the Swiss Alps and the Jura on the 26th covering them with nearly 2ft. of snow down to a level of 2,500ft. Railway services were interrupted in many parts of Czechoslovakia by heavy rain and snow towards the end of the month, and large tracts of land in Moravia and Silesia were flooded on the 31st. Floods in Smyrna following heavy rains on the 26th and 30th caused 134 deaths and rendered 2,500 families homeless.

Rainfall was in excess in Bombay, Deccan, Mysore and Madras during the first half of the month.

Harvest prospects were greatly enhanced by the excellent rains which fell in South and eastern Australia during the first week of the month; further useful rain occurred in New South Wales and Queensland during the second week, while in the third week steady soaking rains ranging to more than 1in. fell in South Australia.

A severe snowstorm interrupted traffic in many parts of central and northern Saskatchewan on the 15th and 16th. At the beginning of the month temperature was generally below normal in the eastern United States, but above normal in the middle regions and along the Pacific coast. The following week, ending the 14th, was abnormally warm with a weekly mean temperature as much as 14°F. above normal at Marquette (Lake Region) and Peoria (Upper Mississippi Valley). This was followed by a sudden drop in temperature, all districts, except parts of the Atlantic coast and the mountain regions, reporting mean temperatures for the week considerably below normal and as much as 22°F. below normal at Havre (Mountain Region). Precipitation was about or slightly below normal generally, except that rather heavy rain fell in the Gulf States during the first week. Over 70 people are believed to have lost their lives in floods at Pachuca, Mexico. In the Argentine temperature was normal early in the month but fell slightly later, while precipitation was about normal for the first three weeks.

The special message from Brazil states that the distribution of rainfall was irregular over the whole country with an average of 0·63in., 0·55in. and 0·67in. above normal in the northern, central and southern regions respectively. Five anticyclones passed across the country. The condition of the crops was improving with the increased rainfall. At Rio de Janeiro pressure was 1·4mb. below normal and temperature 1·8°F. above normal.

Rainfall, October, 1930.—General Distribution

England and Wales	87	per cent of the average 1881-1915.
Scotland	149	
Ireland	162	
British Isles	119	

Rainfall: October, 1930: England and Wales

Co.	Station	In.	Per-cent of Av.	Co.	Station	In.	Per-cent. of Av.
Lond.	Camden Square	1·27	48	*Leics.*	Belvoir Castle	1·56	58
Sur.	Reigate, Alvington	1·72	52	*Rut.*	Ridlington	1·61	...
Kent.	Tenterden, Ashenden	2·10	60	*Line.*	Boston, Skirbeck	·96	35
,, .	Folkestone, Boro. San.	1·46	...	,, .	Cranwell Aerodrome	1·59	55
,, .	Margate, Cliftonville	1·05	36	,, .	Skegness, Marine Gdns	1·37	63
,, .	Sevenoaks, Speldhurst	1·63	...	,, .	Louth, Westgate	1·59	49
Sus.	Patching Farm	3·47	88	,, .	Brigg, Wrawby St.	2·21	...
,, .	Brighton, Old Steyne	2·62	68	*Notts.*	Worksop, Hodsock	1·82	69
,, .	Heathfield, Barklye	2·48	60	*Derby.*	Derby, L. M. & S. Rly.	3·06	117
Hants.	Ventnor, Roy. Nat. Hos.	3·39	86	,, .	Buxton, Devon Hos.	7.31	149
,, .	Fordingbridge, Oaklnds	2·23	54	*Ches.*	Runcorn, Weston Pt.	4·92	143
,, .	Ovington Rectory	2·09	52	,, .	Nantwich, Dorfold Hall	4·10	...
,, .	Sherborne St. John	1·45	41	*Lancs.*	Manchester, Whit. Pk.	4·57	138
Berks.	Wellington College	1·16	35	,, .	Stonyhurst College	8·01	178
,, .	Newbury, Greenham	1·58	45	,, .	Southport, Hesketh Pk	5·48	155
Herts.	Welwyn Garden City	·99	...	,, .	Lancaster, Strathspey	7·22	...
Bucks.	High Wycombe	1·19	38	*Yorks.*	Wath-upon-Dearne	1·95	70
Oxf. .	Oxford, Mag. College	1·25	45	,, .	Bradford, Lister Pk.	3·65	105
Nor.	Pitsford, Sedgebrook	1·47	55	,, .	Oughtershaw Hall	11·35	...
,, .	Oundle	·82	...	,, .	Wetherby, Ribston H.	2·09	70
Beds.	Woburn, Crawley Mill	1·00	37	,, .	Hull, Pearson Park	1·90	64
Cam.	Cambridge, Bot. Gdns.	·81	34	,, .	Holme-on-Spalding	2·28	...
Essex.	Chelmsford, County Lab	1·06	43	,, .	West Witton, Ivy Ho.	3·61	...
,, .	Lexden Hill House	·95	...	,, .	Felixkirk, Mt. St. John	2·41	84
Suff.	Hawkedon Rectory	1·12	41	,, .	Pickering, Hungate	1·91	...
,, .	Haughley House	·55	...	,, .	Scarborough	1·47	47
Norf.	Norwich, Eaton	·95	30	,, .	Middlesbrough	2·08	69
,, .	Wells, Holkham Hall	·94	67	,, .	Baldersdale, Hury Res.	4·05	...
,, .	Little Dunham	1·07	34	*Durh.*	Ushaw College	2·20	64
Wilts.	Devizes, Highclere	2·19	70	*Nor.*	Newcastle, Town Moor	1·59	50
,, .	Bishops Cannings	2·56	77	,, .	Bellingham, Highgreen	3·61	...
Dor.	Evershot, Melbury Ho.	3·36	73	,, .	Lilburn Tower Gdns.	2·20	...
,, .	Creech Grange	2·70	...	*Cumb.*	Geltsdale	4·75	...
,, .	Shaftesbury, Abbey Ho.	2·33	60	,, .	Carlisle, Scaleby Hall	4·61	138
Devon.	Plymouth, The Hoe	4·05	102	,, .	Borrowdale, Seathwaite	23·01	192
,, .	Polapit Tamar	7·18	149	,, .	Borrowdale, Rosthwaite	19·32	...
,, .	Ashburton, Druid Ho.	...	...	,, .	Keswick, High Hill	10·29	...
,, .	Cullompton	4·39	106	*Glam.*	Cardiff, Ely P. Stn.	5·32	111
,, .	Sidmouth, Sidmount	3·19	86	,, .	Treherbert, Tynywaun	13·78	...
,, .	Filleigh, Castle Hill	7·33	...	*Carm.*	Carmarthen Friary	7·82	137
,, .	Barnstaple, N. Dev. Ath.	5 82	128	,, .	Llanwrda	9·53	150
Corn.	Redruth, Trewirgie	5·84	111	*Pemb.*	Haverfordwest, School	7·05	130
,, .	Penzance, Morrab Gdn.	5·71	122	*Card.*	Aberystwyth	6·51	...
,, .	St. Austell, Trevarna	6·63	126	,, .	Cardigan, County Sch.	7·51	...
Soms.	Chewton Mendip	4·31	89	*Brec.*	Crickhowell, Talymaes	6·00	...
,, .	Long Ashton	3·89	...	*Rad.*	Birm W. W. Tyrmynydd	8·72	132
,, .	Street, Millfield	3·33	...	*Mont.*	Lake Vyrnwy	9·04	159
Glos. .	Cirencester, Gwynfa	2·37	72	*Denb.*	Llangynhafal	4·95	...
Here.	Ross, Birchlea	2·66	81	*Mer.*	Dolgelly, Bryntirion	9·51	156
,, .	Ledbury, Underdown	2·59	84	*Carn.*	Llandudno	4·53	138
Salop.	Church Stretton	3·91	108	,, .	Snowdon, L. Llydaw 9	28·70	...
,, .	Shifnal, Hatton Grange	3·29	116	*Ang.*	Holyhead, Salt Island	6.11	153
Worc.	Ombersley, Holt Lock	3·08	115	,, .	Lligwy	6·13	...
,, .	Blockley	2·27	...	*Isle of Man*			
War.	Farnborough	...	...		Douglas, Boro' Cem.	8·02	176
,, .	Birmingham, Edgbaston	2·84	102	*Guernsey*			
Leics.	Thornton Reservoir	2·20	78		St. PeterP't. GrangeRd.	3·58	80

Rainfall: October, 1930: Scotland and Ireland

Co.	Station	In.	Per-cent of Av.	Co.	Station	In.	Per-cent of Av.
Wigt.	Pt. William, Monreith	7·22	...	*Suth.*	Loch More, Achfary ...	11·20	144
,, .	New Luce School.....	7·49	...	*Caith.*	Wick.....	3·64	123
Kirk.	Carsphairn, Shiel.....	14·15	...	*Ork.*	Pomona, Deerness.....	4·88	129
Dumf.	Dumfries, Crichton, R.I	6·13	165	*Shet.*	Lerwick	4·74	120
,, .	Eskdalemuir Obs.....	11·51	213	*Cork.*	Caheragh Rectory.....	6·50	...
Roxb.	Branxholm	6·27	193	,, .	Dunmanway Rectory...	6·84	114
Selk.	Ettrick Manse.....	10·86	...	,, .	Ballinacurra.....	4·97	122
Peeb.	West Linton.....	5·12	...	,, .	Glanmire, Lota Lo.....	5·24	126
Berk.	Marchmont House.....	3·85	101	*Kerry.*	Valentia Obsy.....	7·48	134
Hadd.	North Berwick Res.....	1·88	64	,, .	Gearahameen.....	8·80	...
Midl.	Edinburgh, Roy. Obs.	3·17	122	,, .	Killarney Asylum.....	7·98	149
Ayr.	Kilmarnock, Agric. C.	6·09	173	,, .	Darrynane Abbey.....	7·09	141
,, .	Girvan, Pinmore..	9·06	181	*Wat.*	Waterford, Brook Lo...	6·15	157
Renf.	Glasgow, Queen's Pk..	6·44	198	*Tip.*	Nenagh, Cas. Lough...	6·93	204
,, .	Greenock, Prospect H.	10·17	189	,, .	Rosecrea, Timoney Park	5·51	...
Bute.	Rothesay, Ardencraig.	9·56	217	,, .	Cashel, Ballinamona...	6·17	171
,, .	Dougarie Lodge.....	7·54	...	*Lim.*	Foynes, Coolnanes.....	6·86	181
Arg.	Ardgour House	17·48	...	,, .	Castleconnel Rec.....	6·48	...
,, .	Manse of Glenorchy...	12·36	...	*Clare.*	Inagh, Mount Callan...	10·73	...
,, .	Oban.....	8·12	...	,, .	Broadford, Hurdlest'n.	6·36	...
,, .	Poltalloch	9·29	188	*Wexf.*	Gorey, Courtown Ho...	5·36	151
,, .	Inveraray Castle...	12·94	184	*Kilk.*	Kilkenny Castle.....	4·66	148
,, .	Islay, Eallabus.....	10·94	229	*Wic.*	Rathnew, Clonmannon	5·26	...
,, .	Mull, Benmore.....	13.10	...	*Carl.*	Hacketstown Rectory..	6·17	162
,, .	Tiree	6·40	...	*Leix.*	Blandsfort House.....	4·91	140
Kinr.	Loch Leven Sluice.....	3·59	104	,, .	Mountmellick.....	5·35	...
Perth.	Loch Dhu.....	11·50	161	*Off'ly.*	Birr Castle.....	4·64	159
,, .	Balquhidder, Stronvar	11·63	...	*Kild'r.*	Monasterevin	4·06	...
,, .	Crieff, Strathearn Hyd.	4·63	118	*Dubl.*	Dublin, FitzWm. Sq...	3·85	144
,, .	Blair Castle Gardens...	5·80	187	,, .	Balbriggan, Ardgillan.	3·29	122
,, .	Glen Bruar, Bruar Ldg.	8·21	...	*Me'th.*	Beauparc, St. Cloud...	4·78	...
Angus.	Kettins School.	3·00	105	,, .	Kells, Headfort.....	5·95	177
,, .	Dundee, E. Necropolis	2·77	104	*W.M.*	Moate, Coolatore.....	4·50	...
,, .	Pearsie House.....	3·69	...	,, .	Mullingar, Belvedere..	6·11	196
,, .	Montrose, Sunnyside...	2·69	97	*Long.*	Castle Forbes Gdns.....	5·64	173
Aber.	Braemar, Bank...	5·65	150	*Gal.*	Ballynahinch Castle...	10·04	168
,, .	Logie Coldstone Sch....	3·13	97	,, .	Galway, Grammar Sch.	6·35	...
,, .	Aberdeen, King's Coll.	3·05	192	*Mayo.*	Mallaranny.....	4·08	...
,, .	Fyvie Castle.....	4·31	...	,, .	Westport House.....	8·34	185
Moray.	Gordon Castle.....	4·39	139	,, .	Delphi Lodge.....	15·95	...
,, .	Grantown-on-Spey.....	...	...	*Sligo.*	Markree Obsy.....	7·27	177
Nairn.	Nairn, Delnies	3·72	158	*Cav'n.*	Belturbet, Cloverhill...	4·69	161
Inv.	Kingussie, The Birches	4·51	...	*Ferm.*	Enniskillen, Portora...	6·42	.
,, .	Loch Quoich, Loan.....	18·31	...	*Arm.*	Armagh Obsy.....	5·35	197
,, .	Glenquoich.....	17·85	178	*Down.*	Fofanny Reservoir.....	9·78	...
,, .	Inverness, Culduthel R.	3·17	...	,, .	Seaforde.....	5·76	162
,, .	Arisaig, Faire-na-Squir	7·89	...	,, .	Donaghadee, C. Stn...	4·78	165
,, .	Fort William.....	12·60	...	,, .	Banbridge, Milltown...	3·99	...
,, .	Skye, Dunvegan.....	10·89	...	*Antr.*	Belfast, Cavehill Rd...	5·94	...
R & C.	Alness, Ardross Cas ...	6·12	159	,, .	Glenarm Castle.....	7·24	...
,, .	Ullapool	7·11	...	,, .	Ballymena, Harryville	6·90	187
,, .	Torridon, Bendamph...	10·84	135	*Lon.*	Londonderry, Creggan	7·41	201
,, .	Achnashellach.....	10·65	...	*Tyr.*	Donaghmore.....	6·01	...
,, .	Stornoway.....	...	...	,, .	Omagh, Edenfel.....	6·77	184
Suth.	Lairg.....	5·98	...	*Don.*	Malin Head.....	5·43	...
,, .	Tongue	5·29	126	,, .	Dunfanaghy.....	5·99	...
,, .	Melvich.....	5·79	...	,, .	Killybegs, Rockmount.	9·24	165

Climatological Table for the British Empire, May, 1930.

STATIONS	PRESSURE		TEMPERATURE							Relative Humidity.	Mean Cloud Am'nt	PRECIPITATION			BRIGHT SUNSHINE	
	Mean of Day M.S.L.	Diff. from Normal	Absolute		Mean Values				Mean Wet Bulb			Am'nt	Diff. from Normal	Days	Hours per day	Percentage of possible
			Max.	Min.	Max.	Min.	½ max. and min.	Diff. from Normal								
	mb.	mb.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	%	0—10	in.	in.			
London, Kew Obsy. ..	1014·8	— 1·1	71	39	60·4	46·6	53·5	+ 0·1	47·4	83	7·3	3·46	+ 1·74	19	4·9	32
Gibraltar.....	1017·6	+ 1·5	90	52	74·0	57·1	65·5	0·0	56·6	84	3·3	0·34	— 1·39	3	..	..
Malta	1015·7	+ 0·7	81	54	69·4	58·9	64·1	— 1·8	59·1	75	5·3	0·34	— 0·07	2	9·5	68
St. Helena	1015·2	+ 1·3	..	57	..	59·0	..	..	59·8	91	7·5	2·22	— 1·93	12	..	..
Sierra Leone	1014·2	+ 3·0	90	70	85·1	73·7	79·4	— 2·1	76·1	85	7·7	9·89	— 1·58	15	..	..
Lagos, Nigeria	1010·0	— 1·0	90	72	87·8	75·9	81·9	+ 0·1	77·5	82	8·2	8·61	— 1·86	16	..	..
Kaduna, Nigeria	1014·7	+ 2·0	93	65	89·1	70·5	79·8	+ 0·4	72·6	76	1·0	6·34	+ 0·40	20	..	..
Zomba, Nyasaland ..	1017·2	+ 2·1	79	51	72·2	55·8	64·0	— 1·8	..	79	5·7	0·14	— 0·90	4	..	..
Salisbury, Rhodesia ..	1018·3	+ 1·6	77	41	70·0	47·6	58·8	— 1·8	51·6	54	2·9	0·00	— 0·54	0	7·6	68
Cape Town	1021·2	+ 3·2	89	41	74·2	52·4	63·3	+ 4·4	52·7	75	3·7	0·30	— 3·45	6	..	..
Johannesburg.....	1023·7	+ 2·7	72	31	66·3	43·9	55·1	+ 0·7	43·0	45	1·1	0·78	+ 0·02	3	9·5	87
Mauritius	1017·6	+ 1·2	83	61	79·3	67·5	73·4	+ 0·8	69·3	69	4·1	2·54	— 0·49	15	8·2	73
Bloemfontein	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Calcutta, Alipore Obsy.	1003·8	+ 0·3	102	72	95·9	79·1	87·5	+ 1·5	79·7	82	6·0	4·66	— 1·09	8*	..	..
Bombay	1007·8	+ 0·4	93	79	92·2	81·2	86·7	+ 0·8	78·2	73	2·2	0·02	— 0·53	0*	..	..
Madras	1005·2	— 0·2	107	73	96·7	78·9	87·8	— 2·1	77·8	70	5·7	8·14	+ 7·07	5*	..	..
Colombo, Ceylon	1009·5	+ 0·9	88	73	86·2	77·1	81·7	— 0·8	78·4	82	7·3	26·24	+ 13·56	24	6·9	56
Hongkong	1009·0	+ 0·4	89	73	83·5	76·2	79·9	+ 2·5	75·6	79	7·3	6·19	— 5·41	14	6·6	50
Sandakan	..	..	92	73	88·9	75·2	82·1	— 0·5	77·6	82	..	8·56	+ 2·65	17	..	..
Sydney, N.S.W.	1023·6	+ 5·0	74	46	66·2	51·6	58·9	+ 0·1	53·7	82	5·0	5·05	— 0·08	9	6·1	59
Melbourne	1024·6	+ 5·1	76	35	63·4	47·2	55·3	+ 1·2	50·6	70	5·9	3·26	+ 1·08	11	4·6	49
Adelaide	1024·0	+ 3·9	80	43	69·6	51·2	60·4	+ 2·5	51·5	57	5·0	1·14	— 1·62	6	5·9	58
Perth, W. Australia ..	1018·9	+ 0·4	79	47	70·8	54·6	62·7	+ 2·1	56·9	75	6·0	2·47	— 2·47	12	5·4	52
Coolgardie	1020·3	+ 0·5	83	37	73·0	49·2	61·1	+ 3·5	52·9	60	4·2	1·36	0·00	5	..	..
Brisbane	1022·2	+ 3·4	81	50	72·0	56·6	64·3	— 0·2	59·1	74	4·9	7·98	+ 5·15	15	5·9	55
Hobart, Tasmania....	1021·6	+ 6·0	71	37	59·4	45·5	52·5	+ 2·1	46·8	71	6·1	1·47	— 0·39	12	4·6	47
Wellington, N.Z.	1019·4	+ 3·8	62	35	56·4	44·9	50·7	— 2·0	47·9	79	5·4	2·59	— 2·09	8	5·6	57
Suva, Fiji	1013·0	+ 0·2	88	68	81·2	72·1	76·7	+ 0·2	72·4	80	8·0	11·18	+ 1·02	25	2·7	24
Apia, Samoa	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kingston, Jamaica....	1013·6	+ 0·5	91	68	88·5	72·4	80·5	+ 0·8	72·2	77	3·0	0·96	— 3·43	4	8·3	64
Grenada, W.I.	1014·0	+ 1·5	90	72	87·8	74·0	80·9	+ 1·3	74·2	77	3·3	1·74	— 2·85	13	..	..
Toronto	1015·3	+ 0·5	87	37	67·3	47·7	57·5	+ 4·8	50·4	67	4·9	2·74	— 0·24	14	8·0	54
Winnipeg	1013·3	— 1·0	91	26	60·1	40·7	50·4	— 1·2	43·8	90	6·5	4·11	+ 1·81	16	5·9	38
St. John, N.B.	1013·2	— 0·8	72	35	57·7	40·4	49·1	+ 1·4	44·3	68	5·4	2·05	— 1·66	14	6·9	46
Victoria, B.C.	1015·5	— 0·9	68	39	58·5	45·5	52·0	— 1·1	47·8	77	5·6	0·53	— 0·77	6	9·2	61

* For Indian stations a rain day is a day on which 0·1 in. or more rain has fallen.

* For Indian stations a rain day is a day on which 0·1 in. or more rain has fallen.

* For Indian stations a rain day is a day on which 0·1 in. or more rain has fallen.